

# On farm Technology: Help or Hindrance

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# Our location and crops



Fresno County



Over 20 crops across 7500 acres  
Organic, Conventional and GMO

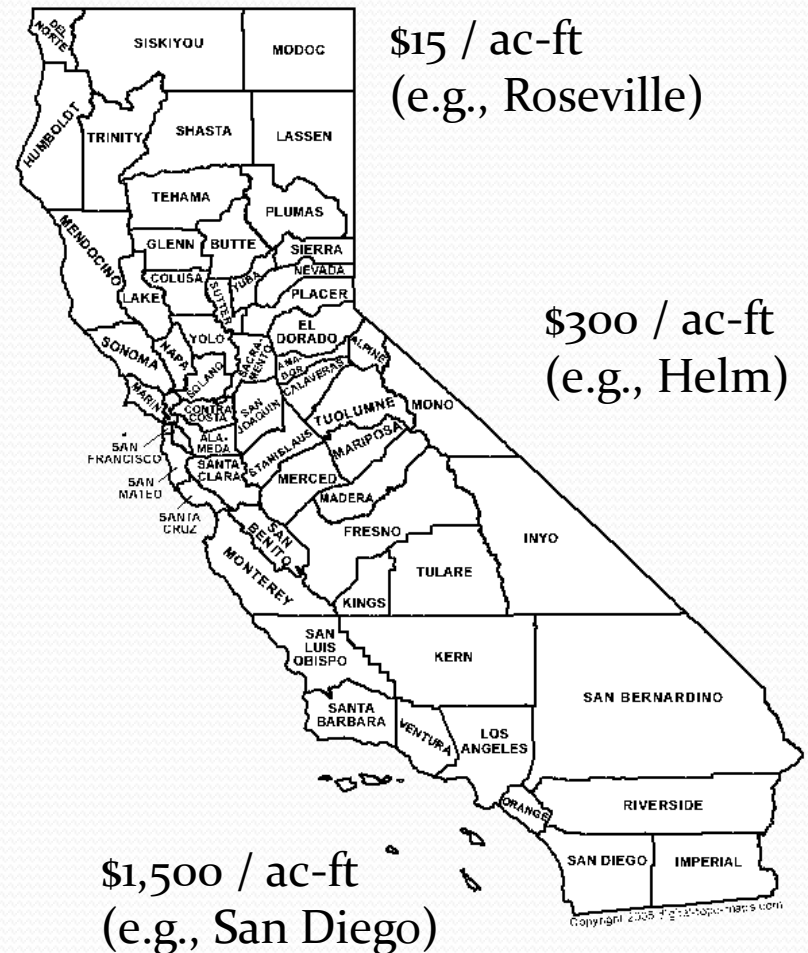
# Smart Irrigation Techniques



- All Vegetable Crops Use Subsurface Drip Irrigation
- Onions and Carrots Use High Efficiency Sprinklers.
- All Almonds, Pistachio, Walnut and Wine Grapes Use Above Ground Drip Irrigation
- Zonal Irrigation

# Water cost is linked to energy

- Water and energy are linked:
  - It takes energy to convey water (surface water) and pump water (groundwater)
  - It takes water to generate electricity
- Cost of water for agriculture varies and depends on energy foot-print to convey water
  - No pump touching water near Sacramento (gravity)
  - Well pumps near Fresno
  - Over 20 pumps touching water to get to San Diego

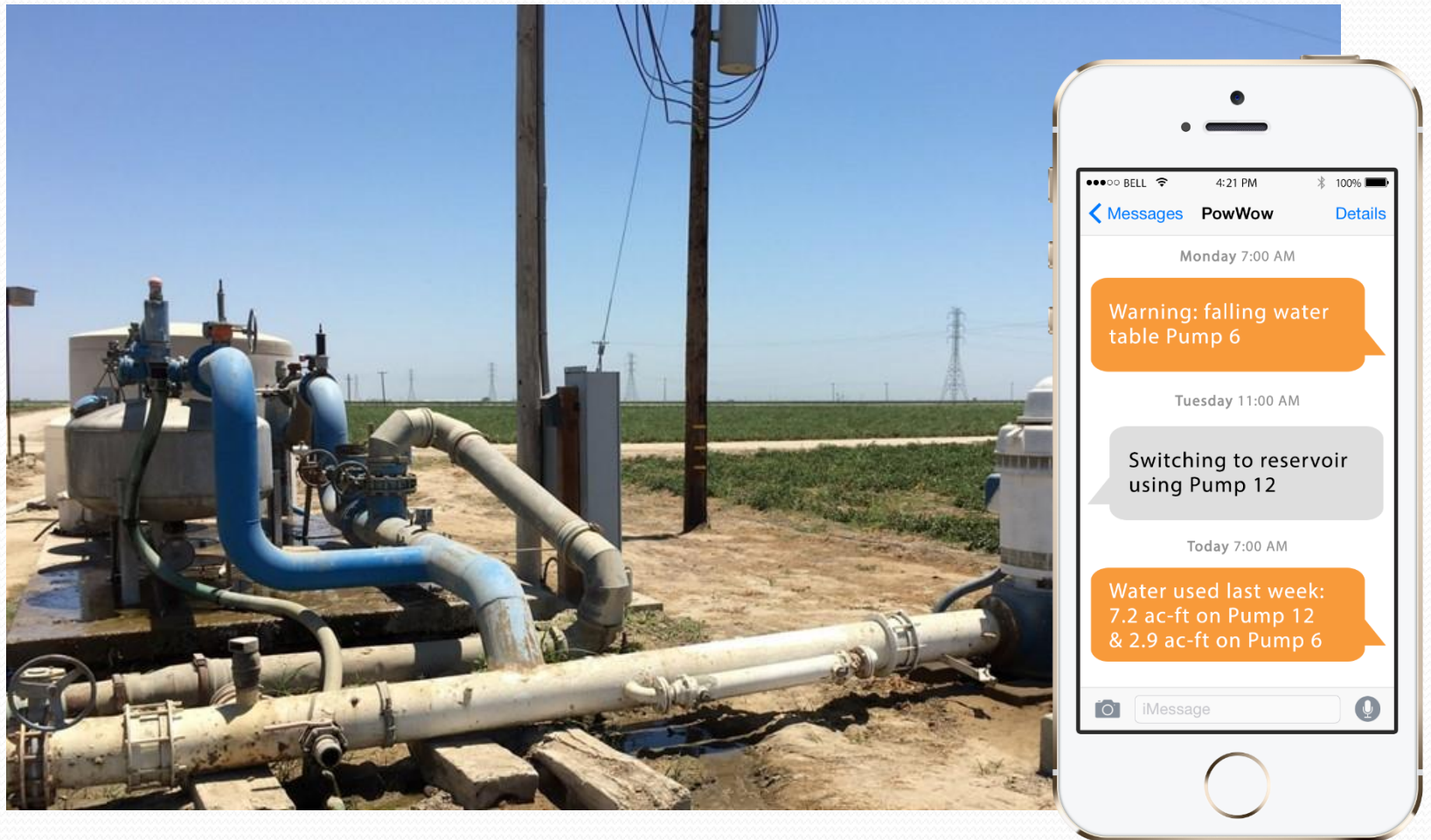




# Project with smart meters



# Help: information, not data



# Example of pump alerts

## Leak (Roseville)

## Filter clogs (Helm)



Early leak

Big leak

Leak fixed



Clog

More clogs

Filter clogs over  
running pump



# Water measurement

## Can we use smart meter?

- Yes but pressure and pump efficiency change over time
- Relationship between energy and water use is not constant
- High-frequency data and algorithms (PowWow) can be used to track water use
- Study funded by California Energy Commission under contract EPC-14-081

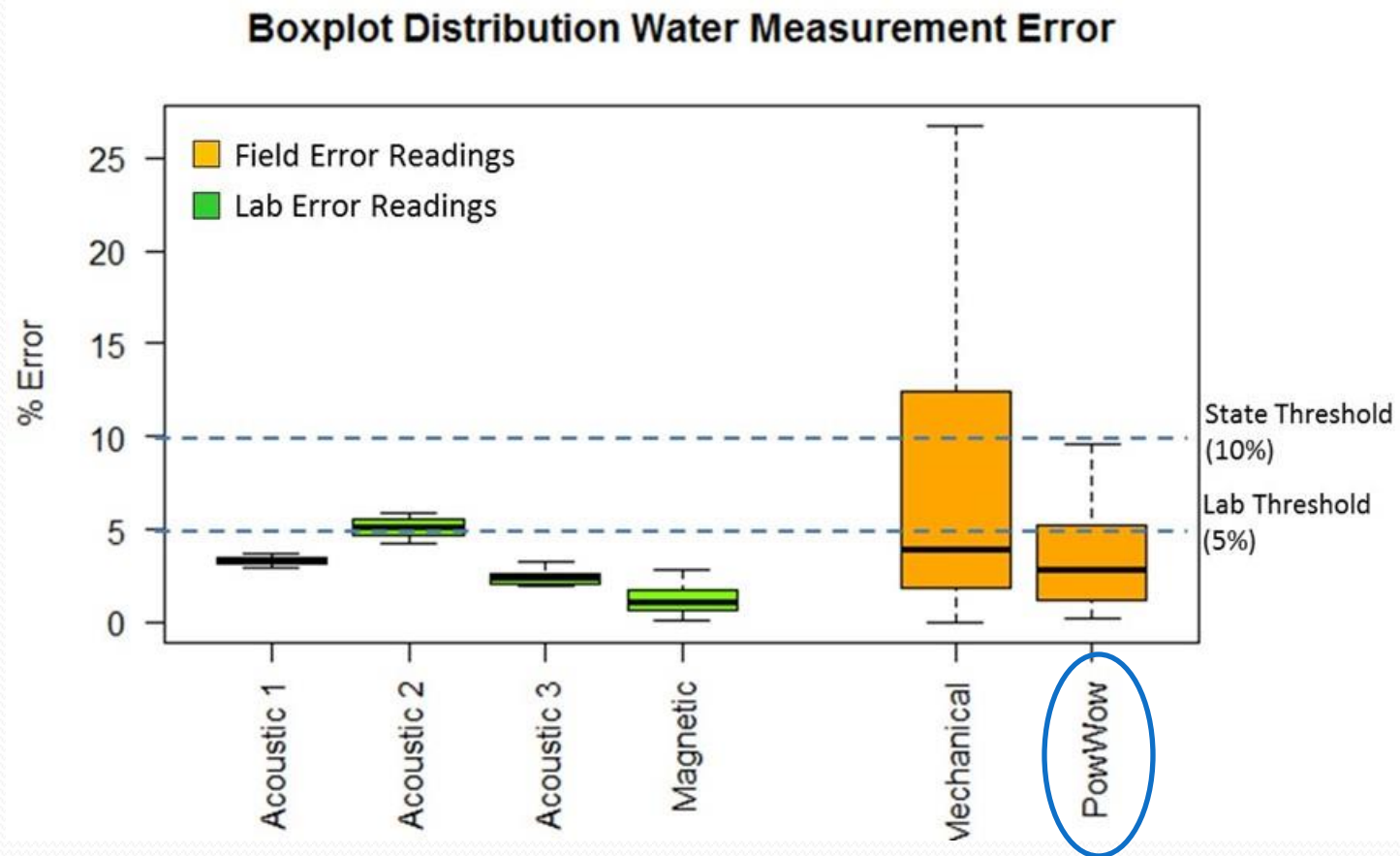
## Test on 20 pumps in 6 basins



Source: UCSB



# Comparison of accuracy



Source: UCSB

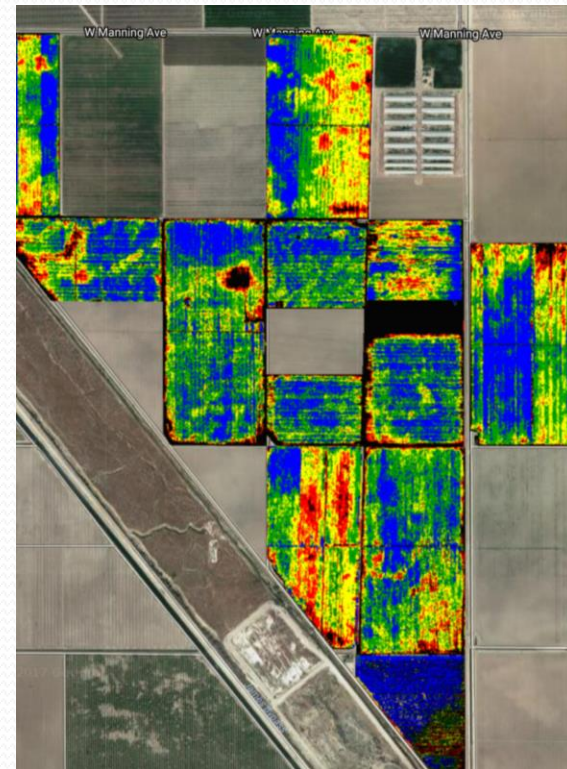
# Other useful technologies

## On-farm weather station



Source: DTN

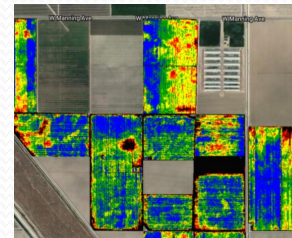
## Aerial images



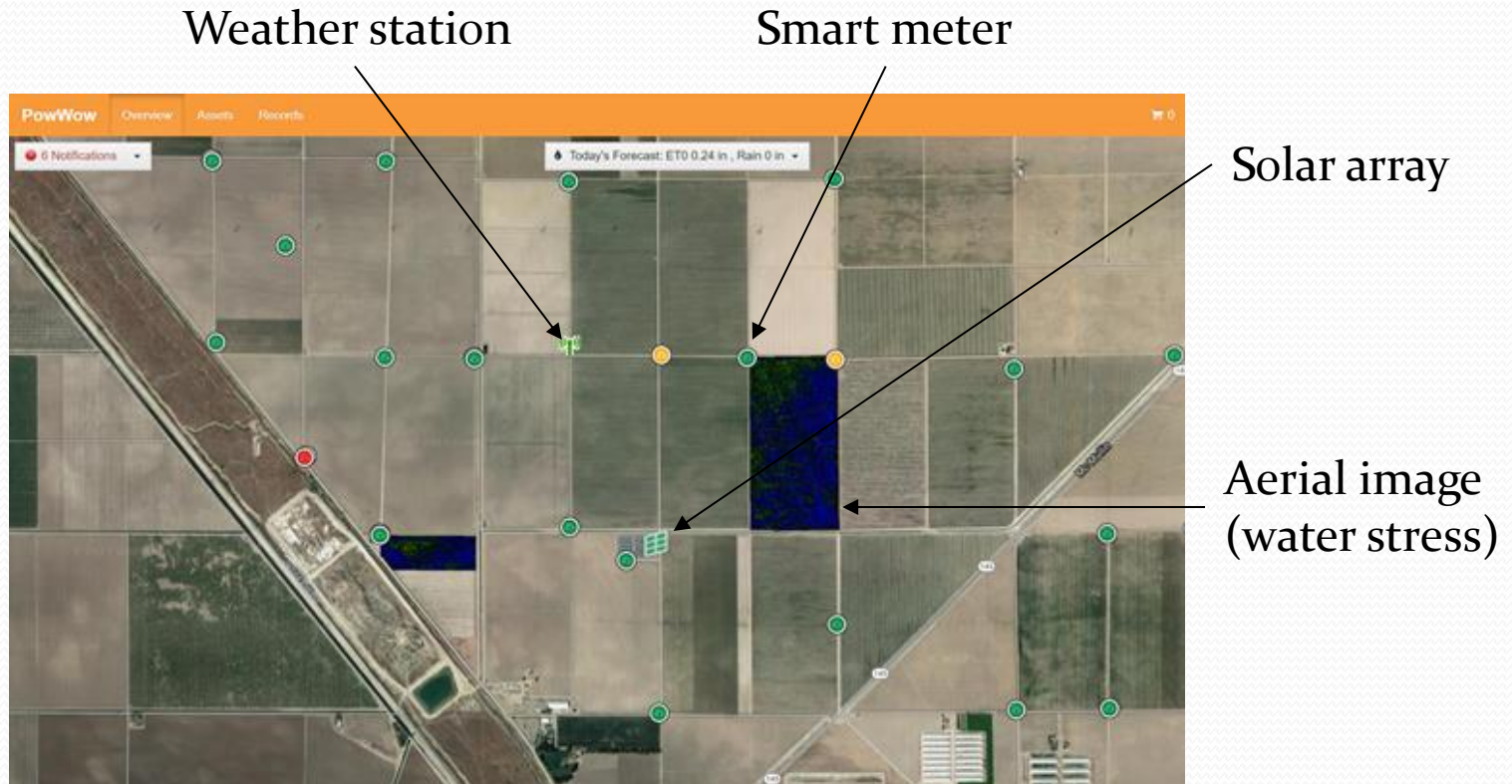
Source: Ceres Imaging

# Hindrance: integration of data

**I don't have time to look at data on multiple apps**



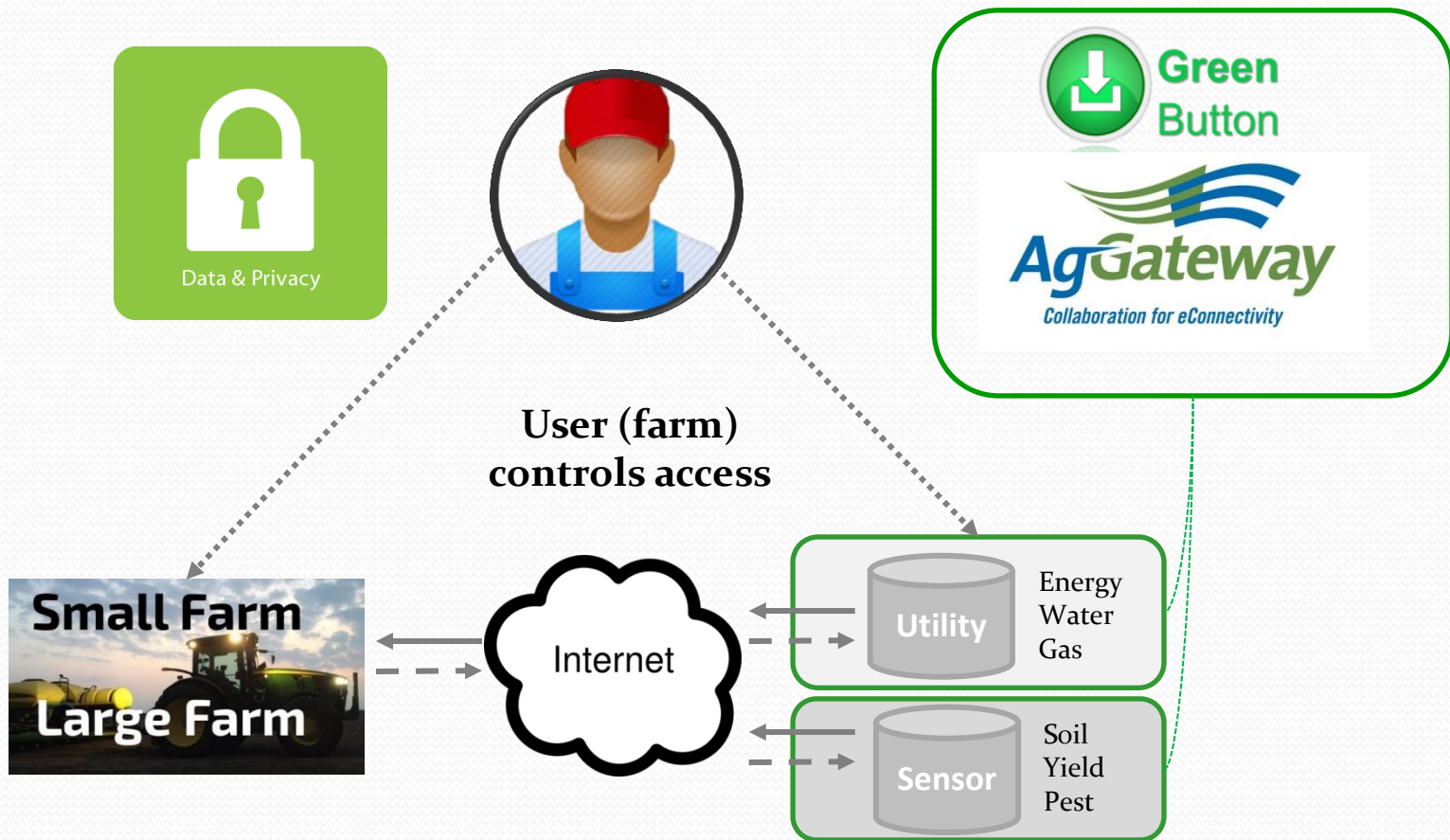
# Prototype to integrate data



Source: PowWow Energy



# Privacy: standards are critical



# What's Driving the Change?

- Five Years of Drought
- Sustainable Groundwater Management
- Increased Pricing
- Decreased Availability
- More Valuable Crops





# Thank You

Questions?